HVAC Data Model

Why Do We Need a Data Model for HVAC Components?

Many building design and analysis software tools use the same data. Each tool requires the separate, repetitive entry of the same information, usually in a different form for each one. The lack of a common data format from one tool to another is a problem because it:

- wastes time
- decreases consistency of data
- reduces opportunities to optimize HVAC system energy use.

The IAI has developed a new building information model (IFC) that allows design tools to share data. However the model lacked an HVAC component, thus limiting its usefulness for building energy analysis purposes. This project successfully extended the IFC data model to include all critical HVAC components needed for seamless data exchange among tools that support HVAC system—

- design and selection
- installation and commissioning
- operation and maintenance.

Life-Cycle Tools

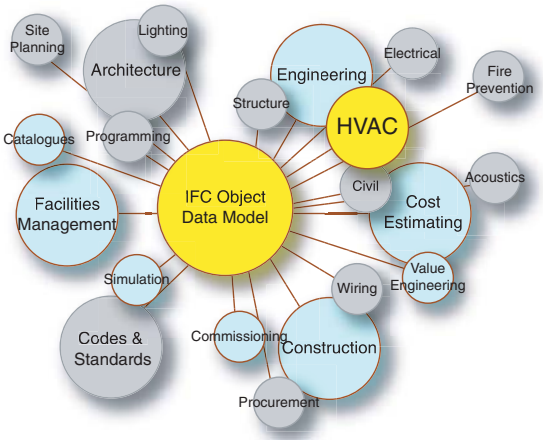
Life-Cycle Tools—integrated building performance management systems—include software tools, analysis techniques, performance metrics, data schema for interoperability, and benchmark databases for evaluating commercial buildings, energy use, and other general performance issues.

HVAC Data Model and the Industry Foundation Classes

The data model of HVAC components is an extension to the Industry Foundation Classes (IFC), the only available comprehensive data model of buildings that is also designed to provide model definitions for the entire building life cycle. IFC are developed by the International Alliance for Interoperability (IAI), an international consortium that develops and promotes software interoperability in the building industry.

The new data model of HVAC components makes it possible for software to exchange data that completely define HVAC equipment and systems. It provides a common basis for interested software developers to define and exchange HVAC data and gives them, for the first time, a common and widely accepted data structure.

The comprehensive, intelligent IFC data model of a building is designed to describe the entire building life cycle. The HVAC model is one of its many necessary components.



Who Benefits?

The greatest benefits will ultimately come to HVAC software end users such as engineers, cost estimators, and facility managers. With minimal effort they will be able to:

- import equipment performance and data
- make comparisons based on performance or cost
- design and specify systems
- simulate performance
- engage in “what-if” analysis
- export data they generate themselves
- reduce cost of initial commissioning and retrocommissioning
- track energy use in building operations.

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Manufacturers will be able to provide product information in a common format so that all interoperable tools have direct access to it.

The use of interoperable tools that effectively share design and operating data could reduce energy analysis costs by 20-50%, allowing more extensive design evaluation with the fixed scope of a given energy analysis budget.

INTERESTED?

The new and expanded model of HVAC components is integrated into the overall IFC data model and is now available for software implementation.

HVAC software developers can incorporate the model into their design and simulation tools for a wide range of HVAC-related applications.

Engineers have access to more powerful IFC-compliant tools to reduce time, cost, and risk.

Manufacturers of HVAC components can provide their product data in one format to all tool developers.

Researchers can more easily explore system integration and life-cycle performance issues with multiple tools sharing the same data base.

The IAI released the new fully integrated IFC2x2 model in May 2003. The beta version of a comprehensive IFC interface to EnergyPlus was released in the late fall of 2003.

HVAC model schemata and the corresponding HTML documentation can be downloaded at:

http://buildings.lbl.gov/hpcbs/Element_2/02_E2_P2_3_1.html

This project is part of LBNL's High-Performance Commercial Building Systems program, a three-year public-private research initiative targeting substantial reductions in the energy costs of commercial buildings.

For access to all program results, see:
http://buildings.lbl.gov/hpcbs

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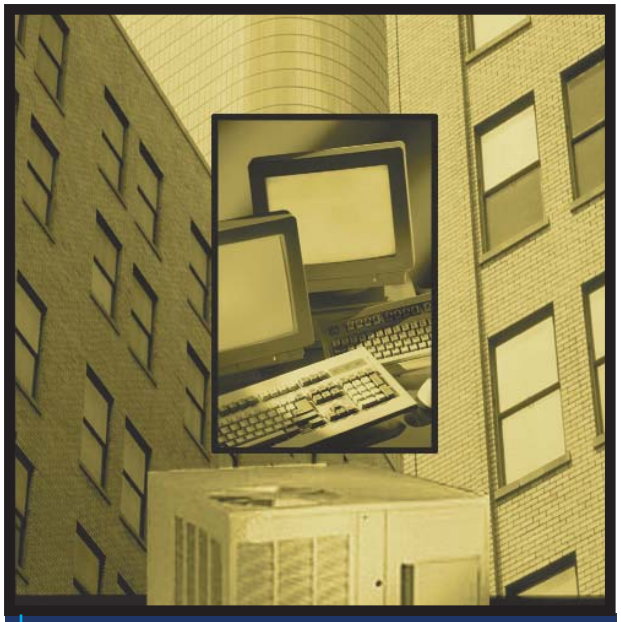

DATA MODELS OF HVAC COMPONENTS

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